

INSU 2500 Chapter 2

August 31

Insurance Principle

- ❑ Since not all exposures or risks are insurable - the redistribution process must be ***financially feasible and sustainable*** over a long period of time.
- ❑ So this chapter focuses on what are the ***characteristics of an ideal insurable event*** by the private insurance industry to produce acceptable results for the insurer. Other exposures not meeting the criteria are either handled by government or not insured.

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How Does an Insurance System Work

- ❑ Many economic units facing with similar loss exposure transfer their loss to a pool.
- ❑ Small premium.
- ❑ Large loss.
- ❑ Redistributes premiums to insurable losses.

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Ideally Insurable Loss Exposures

1. A large group of ***homogeneous*** units exposed to the ***same*** peril.
2. Losses must be ***accidental, unintentional*** from the insured's point of view (beyond control of the insured).
3. Definite/measurable losses capable of causing economic hardship.
4. ***Non-catastrophic*** exposures.

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A large group of homogeneous units exposed to the same peril

- Need for predictive accuracy - allows *the law of large numbers* to work. Homogeneous implies characteristics as well as size of the exposure.
 - Fire damage to brick homes and wooden homes. Can we combine both types of homes in the same pool?
 - What happens if we combine them??
- How about the condition of the same **peril**?
 - Examples? Florida vs. Kansas

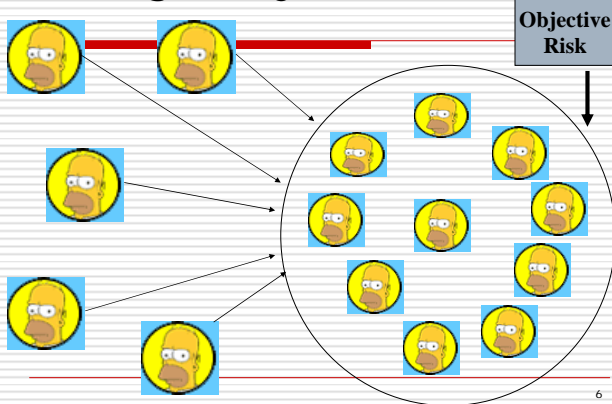
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Insurance Has Long History

- In 3000 BC merchants in Sumer and Babylonia pooled their money to protect themselves from losses from thieves and pirates.
- Greeks and Romans established benevolent societies; dues used to pay burial expenses of members who died.
- Marine, life, disability, and fire insurance developed in Europe beginning in 15th century.
- Ben Franklin formed the Philadelphia Contributorship for the Insurance from Losses by Fire in 1730.
- Presbyterian Ministers' Fund of Philadelphia offered life insurance to members in 1759.



Pooling & Objective Risk



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Non-accidental Losses

- Beyond the control of the insured.
- Arson => non-accidental
 - Who ultimately pays for such losses?
- Physical, *moral*, or morale hazard results in such losses.
- What is a self-defined loss?
 - How do insurers control such losses?

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Non-accidental Losses

- To control moral hazard
- To assure randomness

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Expected Loss

- The expected loss for any individual or group is equal to the probability that a loss will occur multiplied times the amount of the loss.
- If $p = .2$ and $L = \$1,000$, then $EL = .2 \times \$1,000 = \200

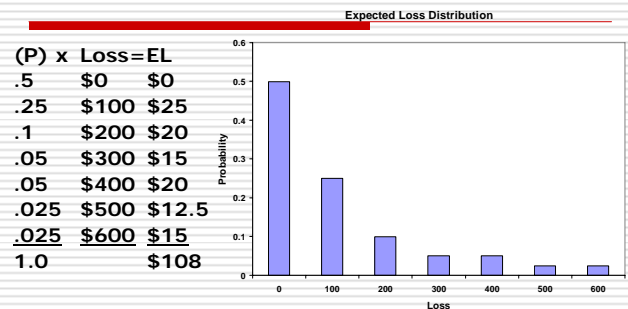
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Definite and Measurable Losses

- **Definite** - no dispute as to whether the loss has occurred. A purpose of insurance is to eliminate uncertainty, not to create it by insuring ambiguous losses such as "feeling bad," wear and tear, or loss of time.
- **Measurable** - a dollar amount must be established in order to place an insured back in the same *financial position* before the loss occurred.

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Expected Loss Distribution



$$\text{Expected Loss} = \sum p_i(x_i)$$

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The Large-Loss Principle

- What is it?
 - Sufficient severity
 - Economic hardship
- Why is it important?
- Why don't insurers cover inexpensive items, especially losses are frequent?
 - How would this affect insurance premiums??

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Requirements of Insurable Risk

- **Large number of exposure units**
 - to predict average loss
- **Accidental and unintentional loss**
 - to control moral hazard
 - to assure randomness
- **Determinable and measurable loss**
 - to facilitate loss adjustment



Non-catastrophic exposures

- Catastrophes are generally unpredictable, and natural catastrophes (floods, earthquakes, and volcanoes) are confined to **limited** geographic areas. What about tornados?
- Are these losses typically covered by a private insurance system? What is the role of the Federal Government??
- Why Federal Government?
 - solvency of the insurers

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More Requirements

- **No catastrophic loss**
 - to allow pooling
 - independent losses
 - use of diversification
- **Calculable chance of loss**
 - to determine accurate premium
- **Economically feasible premium**
 - something people can afford to buy
 - risk of loss and premium must be substantially less than potential loss



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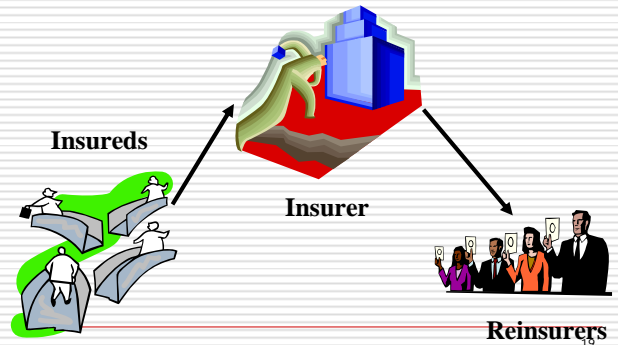
Exercises

- Which one of the following would qualify as a basis for insurance?
 - Loss of a domestic pets
 - Show animals and farm animals
 - A college student's INSU 2500 textbook
 - Insufficient snow to operate a ski resort
 - The potential loss of a person's memory

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Insurance Pictured

Risk Transfer/Diversification →



Reinsurance

- When an insurance company buys insurance, it is called reinsurance.
 - An extremely important concept!
 - We will come back to reinsurance in Ch. 21.
- Why do reinsurance take place?
- How does it work?
- What is the role of the global reinsurance system?

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Gambling vs. Insurance

- What is the difference?
 - Recall the various types of risk?
- Why wouldn't an insurance company insure a gamble?
 - What will happen if an insurer do??
- Risk seeking vs. risk averse individuals
- Insurable interest
 - Pure risk

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Adverse Selection

- Definition in the textbook (pp. 29)
 - Adverse selection occurs when insurance coverage is purchased and all relevant information is not disclosed, (**asymmetric information**) causing rates to be inadequate.
 - What is the major problem associated with adverse selection in insurance?
- Graphical example
- What is the solution to the adverse problem?

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Adverse Selection

- Insurance Becomes Unfeasible When Those Most Exposed To Loss Want Coverage - Insurance works well when a small percent of a large pool of insureds incur loss. When the fraction increases, the premiums increase and the number of willing participants decline. The insurance pool terminates when only those who are likely to suffer loss are left because the premiums become unaffordable relative to the value of the insured property.

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What is Adverse Selection?

- All else equal, high-risk people will find it more attractive to buy insurance than low-risk people.
- If premiums are based on the average expected loss for all individuals, high-risk people will be more likely to purchase insurance than low-risk people.
- Adverse selection can cause a risk pool to collapse as low-risk people leave and the average loss and premium escalates.

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How to Avoid Adverse Selection

- Insurers use *underwriting* selection and risk-based *pricing* to charge each insured the appropriate premium.
- *Underwriting* is a process by which insurers match insureds with an appropriate premium, through selection and risk classification.



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Insurance Subsidization

- Occurs if each insured does not pay the MFP for insurance.
 - Examples?
- What is the solution to this problem?
 - Competition
 - Good underwriting practice

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Principles of Risk Classification

- Separation classes
- Homogeneity
- Reliability
- Incentive value
- Social acceptability
- Auto insurance example:
- Life insurance example:

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Underwriting

- Screening, qualification
- Selection of insureds and the pricing of insurance.
- Underwriters decide:
 - Accept or reject an applicant.
 - Under what conditions to accept.
 - Classification (rating group) the insured belongs in.

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Separation Classes and Class Homogeneity

- Each class should have an identifiable and significantly different expected loss. Within each class, exposures should be homogeneous.
- **Class Homogeneity**
- Examples?

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Reliability

- The proxy used to measure the exposure should be a reliable, verifiable and not subject to manipulation.
- Examples?

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Social Acceptability

- Criteria should be socially acceptable – can be a controversial proxy such as sex, race, age, life-style.

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Incentive Value

- Provides the incentives for reducing frequency or severity of losses
- Examples?

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Examples

Auto Insurance Factors	Gender	Driving Record
Separate Classes?	Yes	Yes
Build Homogeneity?	Not always	Yes
Reliable?	Yes	Yes
Admissible?	No	Yes
Incentive Value	No	Yes
Social Acceptability	Not always	Yes

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Branches of Insurance

- **Government** - Social Security and unemployment
- **Private:**
 - a. Non-life: fire, marine, casualty, bonding
 - b. Life: life, health, annuity

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Objective Question #1

- **The criteria for ideally insurable losses include all the following except:**
 - a. Definite losses.
 - b. Accidental losses.
 - c. A small carefully defined group of exposures.
 - d. Low probability of catastrophic loss.

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Types of Insurance

- **Private Insurance**
 - Life and Health Insurance
 - Property and Liability Insurance
 - auto, home, commercial
- **Government Insurance**
 - **Social Insurance**
 - Social Security, Work Comp, Unemployment
 - **Other Government Insurance**
 - flood, crop



Objective Question #5

- **Insurance should be purchased only when losses are large and uncertain, is a statement of:**
 - a. The central limit theorem
 - b. The rule of adverse selection
 - c. The law of large numbers
 - d. The large loss principle

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Objective Question #6

- **If only the most exposed to loss try to purchase insurance, the insurance pool will fail because:**
 - a. Insurance agents will not sell the coverage.
 - b. The coverage will be too cheap for insurance companies to make money.
 - c. The premiums are likely to be more than most people could afford, and perhaps even greater than the cost of the losses.
 - d. The potential for fraudulent losses will undermine the insurance underwriting.

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Objective Question #8

- ***Incentive value* in a risk classification scheme means:**
 - a. Insureds have a financial incentive to prevent losses.
 - b. Insurers have a financial incentive to find a better class of insureds.
 - c. Agents have an incentive to sell more insurance.
 - d. Insureds have an incentive to purchase the cheapest insurance.

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Objective Question #7

- **Which of the following statements is true regarding the Terrorism Insurance Act of 2002?**
 - a. The act is triggered when the President certified an event is an act of terrorism
 - b. The Department of the Treasury pays for all insured losses after a certified act of terrorism.
 - c. Participation of property and casualty insurers is mandatory.
 - d. The Act lasts for 20 years.

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